

SEMICONDUCTOR INTERNATIONAL

1986 Article Index

This index lists the articles published in *Semiconductor International* in 1986, by the following categories: Processing, Assembly, Testing. Reprints are available on a custom basis at reasonable prices in quantities of 500 or more. Contact Joanne Westphal, Cahners Publishing Co., Reprint Services, 1350 E. Touhy Ave., P.O. Box 5080, Des Plaines, IL 60017-5080 (312) 635-8800.

Processing

- "Overview of Semiconductor Industry," Samuel A. Harrell, Jan., p. 34.
- "Equipment Changes Seen for 'The Factory of the Future,'" G. Dan Hutcheson, Jan., p. 45.
- "Integrated Computer System Improves Yield, Automates Production," Jan., p. 106.
- "Contamination Control: The Search for a Magic Elixir," Stuart A. Hoenig, Feb., p. 37.
- "Today's Clean Room Success," Pieter Burggraaf, Feb., p. 48.
- "Airborne Particle Monitoring Approaches 0.1 μm ," Chuck Murray, Feb., p. 60.
- "The Challenge for Ultrapure Water," Ron Iscoff, Feb., p. 74.
- "Future Requirements of Pure Water Analysis," Clifford F. Frith Jr., Feb., p. 93.
- "The Technology of Computer-aided Design," Peter H. Singer, Feb., p. 105.
- "Continuing Advances in Design Automation," Peter H. Singer, Feb., p. 111.
- "The Impact of CAD," Andrew S. Rappaport, Feb., p. 112.
- "Computer-aided Engineering," Peter H. Singer, Feb., p. 115.
- "Schematic Entry," David R. Coelho, Feb., p. 116.
- "Circuit Simulation," Kevin M. Walsh, Feb., p. 118.
- "Logic and Fault Simulation," John A. Faugno, Feb., p. 119.
- "Computer-aided Design," Peter H. Singer, Feb., p. 122.
- "Custom IC Layout," Greg Peterschmidt, Feb., p. 123.
- "Layout Verification," M. Thomas Yin and Henry H.L. Wong, Feb., p. 125.
- "Pattern Generation," Dick Stangl, Feb., p. 126.
- "CAE/CAD Hardware," Peter H. Singer, Feb., p. 129.
- "Trends in Workstations," Carl Azar, Feb., p. 130.
- "PC-based CAE," Terry A. Zimmerman, Feb., p. 131.
- "The Semicustom Revolution," Peter H. Singer, Feb., p. 132.
- "Designing with Standard Cells," Charles L. Saxe, Feb., p. 133.
- "Silicon Compilation," Daniel J. Gajski, Feb., p. 134.
- "Designing with Gate Arrays," Robert J. Humphrey, Feb., p. 135.
- "Routing Algorithms," Mary N. Youssef, Feb., p. 136.
- "The Silicon Foundry Interface," Robert M. Gardner and Roger T. Baker, Feb., p. 137.
- "Merchant Mask-making in a State of Change," Peter H. Singer, Mar., p. 44.
- "Wafer Steppers and Lens Options," Pieter Burggraaf, Mar., p. 56.
- "Additive X-ray Mask Patterning," Phil E. Mauger and Alex R. Shimkus, Mar., p. 70.
- "Photomask and Reticle Materials Review," Ron Iscoff, Mar., p. 82.
- "Competition, Cooperation and the 'International' Approach to Production Equipment," Marc de Leeuw, Apr., p. 40.
- "Trends in Vertical Diffusion Furnaces," Peter H. Singer, Apr., p. 56.

- "Quartzware" for Diffusion Furnaces," Chuck Murray, Apr., p. 64.
- "Ion Implanters: Major 1986 Trends," Pieter Burggraaf, Apr., p. 78.
- "Evaluating Ion Implanter Options," David Church, Apr., p. 94.
- "Applications for MeV Ion Implantation," Dr. Charles McKenna, Dr. Carl Russo, Bjorn Pedersen and Dr. Daniel Downey, Apr., p. 101.
- "Effect of Planarization on VLSI Processing," R.H. Wilson and P.A. Piacente, Apr., p. 116.
- "Calibrating Microscopic Linewidth Measurement Systems," Ron Stein, David H. Cummings and

- Jacob A. Schaper, Apr., p. 132.
- "Hazardous Production Gases Part 1: Storage and Control," Richard A. Bolmen, Apr., p. 156.
- "Automatic Cleaning Technique for Pellicles," Raymond Johnson and Michael N. Golden, Apr., p. 164.
- "The Challenge Facing Mask-makers," Russ Weiss, May, p. 50.
- "The Dawn of Epitaxy's New Era," Pieter Burggraaf, May, p. 68.
- "Wet Etching Update," Chuck Murray, May, p. 80.
- "Assay of Mixed Acid Etchants by Ion

Parker VacuSeal Couplings

A high performance coupling for positive pressure or vacuum applications.

Our Quality Insures Your Purity



For more information contact:

Parker Hannifin Corporation
Instrumentation Connectors Division
P.O. Box 4288
Huntsville, Alabama 35802
205-881-2040
In Canada call:
416-945-2274



For information circle 77

JANUARY, 1987 SEMICONDUCTOR INTERNATIONAL/109

1986 Article Index

"Chromatography," Roy D. Rocklin, May, p. 88.
 "Dry Etching of SiO₂ and Si₃N₄," Peter H. Singer, May, p. 98.
 "Effects of O₂ and SF₆ on the Anisotropic Etching of Polysilicon," Minh Nguyen, May, p. 110.
 "High Pressure Technology for Silicon IC Fabrication," Sing Pin Tay and Joseph P. Ellul, May, p. 122.
 "Submicron 1:1 Optical Lithography," David A. Markie, May, p. 137.
 "The Impact of Stepper Field Registration on Manufacturing," Whit G. Waldo, May, p. 150.

"Optical Lithography and Contrast Enhancement," Don R. Strom, May, p. 162.
 "A Tool for Aggregate Production Planning," Bruce Wieder, May, p. 204.
 "Automation of IC Manufacturing: Control Problems," Robert W. Atherton, May, p. 218.
 "Hazardous Production Gases Part 2: Toxicity and Hazards," Richard A. Bolmen, May, p. 231.
 "SiC Extends Tube Life," May, p. 244.
 "Controversy Cloaks Clean Room Garb," Sandra Leavitt, June, p. 84.
 "Forum Report: Equipment Reliability," Pieter Burggraaf, June, p. 125.

"The Effect of Process Control on Product Quality," James N. Smith, July, p. 35.
 "Use of Excimer Lasers in Photolithography," R.A. Lawes and Chilton Didcot, July, p. 76.
 "Controlling Gold with Phosphorus Gettering," Peter Henry and Dennis Kocyla, July, p. 104.
 "Moving 'ROA' From Accounting to the Fab Line," George A. Rutland, Aug., p. 33.
 "Crystal Growing Trends," Peter H. Singer, Aug., p. 48.
 "Improving Gas Handling Safety," Chuck Murray, Aug., p. 60.
 "Achieving Future Requirements in ULSI Gases," Hubert Boyd, Aug., p. 72.

"Water Quality Improvements and VLSI Defect Density," Paul A. McConahey, Stephen J. Poirier and Reinhard Hanselka, Aug., p. 82.

"Improving Yield in Wafer Slicing," Donald E. Swanson, Aug., p. 95.

"Fluorosilicone Oil for Vacuum Pumps in Oxygen Service," Douglas McKinniss, Aug., p. 132.

"Planning for Inter-equipment Transport Automation," Chuck Murray, Sept., p. 74.

"Total Automation in Wafer Fabrication," Shousuke Shinoda, Sept., p. 86.

"Vacuum Pumps and CVD," Kenneth A. Monnig, Oct., p. 28.

"Molecular Beam Epitaxy," Peter H. Singer, Oct., p. 42.

"Solutions for 'Pump Damaging' Etch and CVD Processes," Pieter Burggraaf, Oct., p. 66.

"Wafer Scale Integration? Time to Get Serious," Donald E. Meyer, Nov., p. 32.

"The 'Growing' Importance of MOCVD," Pieter Burggraaf, Nov., p. 46.

"MOCVD of III-V Compound Epitaxial Layers," L.J. Mawst, G. Costrini, M.A. Emanuel, M.E. Givens, C.A. Zmudzinski and J.J. Coleman, Nov., p. 61.

"Material Requirements of GaAs ICs and Future III-V Devices," Peter H. Singer, Nov., p. 68.

"The Technology of Clean Room Design," Chuck Murray, Nov., p. 75.

"An Overview of Clean Room Design Technology," Stuart A. Hoening, Nov., p. 82.

"Construction Considerations for Submicron IC Facilities," Wilt Workman, Nov., p. 85.

"Applying Federal Standard 209," David Swinehart, Nov., p. 95.

"Designing for Particle Control," Praveen Gupta, Nov., p. 99.

"Minimizing Human Contamination Through Design," George L. Scott, Nov., p. 100.

"Aerosol Particle Monitoring in VLSI Clean Room Design," Don Tolliver, Nov., p. 102.

"Piping the Clean Room," Robert C. Thomas, Nov., p. 108.

"Design for Exhaust Gases," Philip W. Morrison, Nov., p. 111.

"Designing for Fire Safety," Richard A. Bolmen, Nov., p. 112.

"Designing for Efficiency," Don Briner, Nov., p. 118.

"Automated Processing Equipment," John Dooley, Nov., p. 120.

"Automated Inter-equipment Transport," Marlin Shopbell, Nov., p. 121.

"Designing for SMIF," J. Gordon King, Nov., p. 124.

Assembly

"Assembly Catching Up With Productivity Needs," John E. Schaefer, Jan., p. 55.

"Getting TAB Out on the Table," Donald E. Meyer, Feb., p. 39.

"Old 'Saws' Have an Economic Message," C. Harold Gaffin, Mar., p. 32.

"Assembly Process Automation Part 1: PLCC Problems and Solutions," Jeff Braden, Apr., p. 146.

"Assembly Process Automation Part 2: VLSI Design Rules," Jeff Braden, May, p. 178.

Positive or vacuum. Tescom controls your pressure!



Capable of supply pressures of **15-135**

PSIA, the 44-4600 Absolute Pressure Regulator provides control pressures of **1-30 PSIA**!

Designed for high purity gas systems and corrosive media, wetted parts are **316 Stainless**, Teflon® and Elgiloy®.

Assembled in a clean environment, the 44-4600 features a unique diaphragm that offers excellent pressure control sensitivity. Design inboard leak rate is a maximum of **2 x 10⁻⁸ atm cc/sec He** (certified on request).

To minimize media entrapment, you are offered a choice of butt welded *UltraSeal®, Vaculok®,

VCO® and VCR® fittings or Tescom High Purity Internal Connections (machined inside regulator body) designed to fit your choice of vacuum fittings.

Specified RMS finishes are optional. Flow capability is $C_v = .06$.

For more details, contact:

ESCOM
CORPORATION

PRESSURE CONTROLS DIVISION
12616 Industrial Blvd.
Elk River, MN 55330
(612) 441-6330

Teflon® is a registered trademark of DuPont.

Elgiloy® is a registered trademark of Elgiloy Co.

*UltraSeal® is a registered trademark of Parker Hannifin.

Vaculok® is a registered trademark of Hoke Inc.

VCO® and VCR® are registered trademarks of Cajon Co.

"Guidelines for Prevention of ESD Damage to Integrated Circuits," Dave Hughes, May, p. 188.
 "Die Separation: Changing to Meet Industry Needs," Chuck Murray, June, p. 48.
 "Trim and Form Equipment Review," Pieter Burggraaf, June, p. 62.
 "Surface Mount Packaging Report," Technical Staff ICE Corp., June, p. 72.
 "Offshore Assembly: A Time of Change," Ron Iscoff, June, p. 96.
 "Copper Ball Bonding," Lee Levine and Michael Sheaffer, Aug., p. 126.
 "Appreciating the Hybrid Circuit," George R. Tatum, Sept., p. 32.
 "Hybrid Circuit Manufacturing," Pieter Burggraaf, Sept., p. 99.
 "The Hybrid Circuit Industry and Its Technology," Jerry E. Sergent, Sept., p. 104.
 "CAE/CAD in Hybrid Circuit Artwork Generation," Thomas H. Edmondson, Sept., p. 110.
 "Thin Film Patterning Techniques for Hybrid Circuits," Malcolm D. Hill, Sept., p. 112.
 "Polyimides in Hybrid Circuit Processing," John J.H. Reche, Sept., p. 116.
 "The Complexity of Automatic Die Bonding for Hybrid Circuits," Rafi Koriat and Len Marro, Sept., p. 118.
 "Wire Bonding and Alternative Technologies for Hybrid Circuits," Bruce W. Huener, Sept., p. 120.
 "Surface Mounting in Hybrid Circuits," Don Brown, Sept., p. 124.
 "Material Selection for Hybrid Power Package Design," Albert V. Suppinger, Sept., p. 126.
 "Automatic Vision for Hybrid Circuit QC and Inspection," John J. Lee Jr., Sept., p. 128.
 "Ceramic Component Marking with YAG Lasers," Ashok Seth and Jim Scaroni, Oct., p. 80.
 "Measuring Thermal Conductivity of Plastic Encapsulants," Laura VanBrunt and Philip Procter, Oct., p. 89.
 "An Assembly Game Plan: Missing But Still Required," John E. Schaefer, Dec., p. 30.

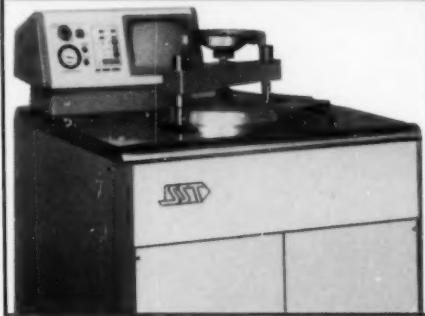
Testing

"The Test Trend is 'Integration,'" Jim Mulady, Jan., p. 63.
 "Repair of Clear Photomask Defects by Laser-Pyrolytic Deposition," Modest M. Oprysko, Mark W. Beranek, Dale E. Ewbank, Arthur C. Titus, Jan., p. 90.
 "A Controlled Wafer Probing Environment for R&D," Paul Margozzi, June, p. 118.
 "Surface Analysis Technology Part 1: Applications," Peter H. Singer, July, p. 46.
 "IR Imaging: Microscopy and Thermography," Pieter Burggraaf, July, p. 58.
 "Subsurface Structural Defects in GaAs Wafers," Robert M. Silva, Fred D. Orazio Jr., and Jean M. Bennett, July, p. 81.
 "Positioning Accuracy for 1M DRAM Repair," Donald Stewart, July, p. 96.
 "Surface Analysis Technology Part 2: Instrumentation," Peter H. Singer, Aug., p. 110.
 "Advances in Prober Reliability," Greg Bieser and Scott McCluskey, Sept., p. 49.
 "Use of Probe Cards in the Production Environment," Steve Evans, Sept., p. 50.
 "Electrical Performance at Probe," Ron Leckie, Sept., p. 52.
 "Memory Testing Requirements," Peter H. Singer, Sept., p. 60.
 "Hybrid Circuit Testing Technology," Neil Golden, Sept., p. 130.
 "Mass Spectrometry in IC Fabrication," Stanley R. Goldfarb, Oct., p. 55.
 "CIM Plans: The Role of Test Area Networks," Pieter Burggraaf, Dec., p. 36.
 "Verifying IC Layouts Through Design Rule Checking," Peter H. Singer, Dec., p. 45.
 "IC Handlers for Thermal Testing," Chuck Murray, Dec., p. 54.

NEW HIGH YIELD IC LID SEALING

The DAP 2200

The new DAP 2200 Programmable Hermetic Sealer is your best solution for solder seal and glass lid sealing of hybrids, semiconductors, microwave and similar electronic packages. It also performs glass-to-glass and glass-to-metal sealing, brazing and annealing in vacuum or controlled gas atmospheres. All with high yields, high reliability, MIL STD883 hermeticity and low operating costs. **Features:** Vacuum bake and seal in same chamber for low moisture. Stores multiple programs in memory for versatility and instantaneous process changeover. Optional RS-232 serial communication and graphic printer for data logging.



Call or write for details:

(213) 803-3361



SCIENTIFIC SEALING TECHNOLOGY

9801 Everest St., Downey, CA 90242
 (213) 803-3361 Telex 69-8283

For information circle 79

CREATIVE POSSIBILITIES

Thru THE MICRO-FIT® WELDING SYSTEM



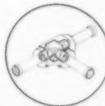
The compact size of the Micro-Fit Welding System makes it ideal for manufacturing high purity gas systems, such as gas cabinets, gas trays and process piping. Micro-Fit fittings are the single greatest improvement you can make in the quality, size and safety of your gas system.

Micro-Fit fittings • Fixturing • Weld heads • Power supply



CREATIVE PATHWAYS, INC.

3121 Fujita St.
 Torrance, CA 90505
 213-530-1965



Micro-Fit Fittings are Patent Pending

For information circle 80

JANUARY, 1987 SEMICONDUCTOR INTERNATIONAL/111